THE HESPERIDIN INHIBITS THE BUTYRYLCHOLINESTERASE FROM SERUM OF HUMAN

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Introduction. The search for new pleiotropic effects of known active pharmaceutical ingredients (APIs) is a current global trend of R&D in the pharmaceutical industry. Special attention is paid to APIs from vegetable raw materials (eg flavonoids). Thus, hesperidin shows a variety of pharmacological effects and is potentially promising for the treatment of neurodegenerative diseases.

Aim. Study of hesperidin influence on butyrylcholinesterase from human serum (BChE).

Methods. QSAR analysis, molecular docking, *ex vivo* kinetic study of BChE inhibition.

Results. Hesperidin is widely used in medicines and dietic supplements to improve blood flow through vazotreads properties. Literature review and in-house QSAR analysis showed that hesperidin also displays the various biological and pharmacological properties, including antiinflammatory, antineoplastic, antidepressant and antioxidant activity. Molecular docking of hesperidin into the active site of BChE allows to assume the existence of the inhibition effect. A spectrophotometric study of the kinetics of inhibition BChE from human serum by hesperidin in *ex vivo* conditions showed that for BChE, $K_i = 30.50 \pm 0.04$ μM, $IC_{50} = 450$ μM. Analysis of the results shows that hesperidin inhibits the enzyme by mixed (partial) mechanism. It is likely that hesperidin binds both to the active site of the enzyme, and outside, and enzyme-substrate complex retains partial activity compared to that of the native enzyme. Considering the data obtained and the features of the hesperidin pharmacokinetics allows assuming that it is the perspective API for the drugs for the treatment of neurodegenerative diseases.

Conclusions. Hesperidin inhibits the BChE by mixed mechanism. Further comprehensive research in this area is relevant with aim of further development of drugs for the treatment of neurodegenerative diseases.